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## Structured Markup to Improve Learning Content Development Environments:

*Bridge API and Open Source Tools for  
Instructional Developers and Life Cycle Managers*

Wayne Gafford, ADL / Schawn Thropp, CTC  
Mark Ewer, LSI / Leslie Lucas, SLC



# Agenda



## **Supporting the Development, Management and Delivery of Distributed Learning**

- ADL – MOU with S1 Council, Purpose
- Understand S1000D to SCORM Connection
- Bridge Project discussion: problem statements, tasks
- Bridge Project open source demos:
  - SCO Workbench, Transformation Toolkit, ECP Web Service

**ADL – S1000D Council  
Memorandum of  
Understanding**

**Signed March, 2011**

- **Main Points:**

- **What is S1000D?**

An international specification for the procurement and production of technical publications. It is an XML specification for preparing, managing, and using equipment maintenance and operations information.

**It provides structured markup. For example...**

```
<lcTaskItem>
```

```
<description>
```

```
<para>Describe the Sharable Content Object (SCO) concept, and  
identify the three defining characteristics of a SCO.</para>
```

```
</description>
```

```
</lcTaskItem>
```

- **Who signed the MOU:**

- Aerospace and Defense Industries of Europe (ASD)
- The Aerospace Industries Association (AIA)
- The Air Transport Association (ATA)
- Advanced Distributed Learning (ADL)

- **Main MOU Points:**

- Continued refinement of technical training support in S1000D.
- Continued harmonization of S1000D and SCORM that leads to data readiness and learning content management cost savings.

- **Current MOU-based Activities**

- **Bridge Project** – demonstrating shared markup, API and open source tool development packaged to improve life cycle management of technical training content.

- **Naval Postgraduate School BAA – Proposal Submitted** – Acquisition research on impacts of using life cycle standards for defense acquisition management and integrated data environments. Create unified methods for creating training and maintenance requirements.

- Ten tasks, two years.



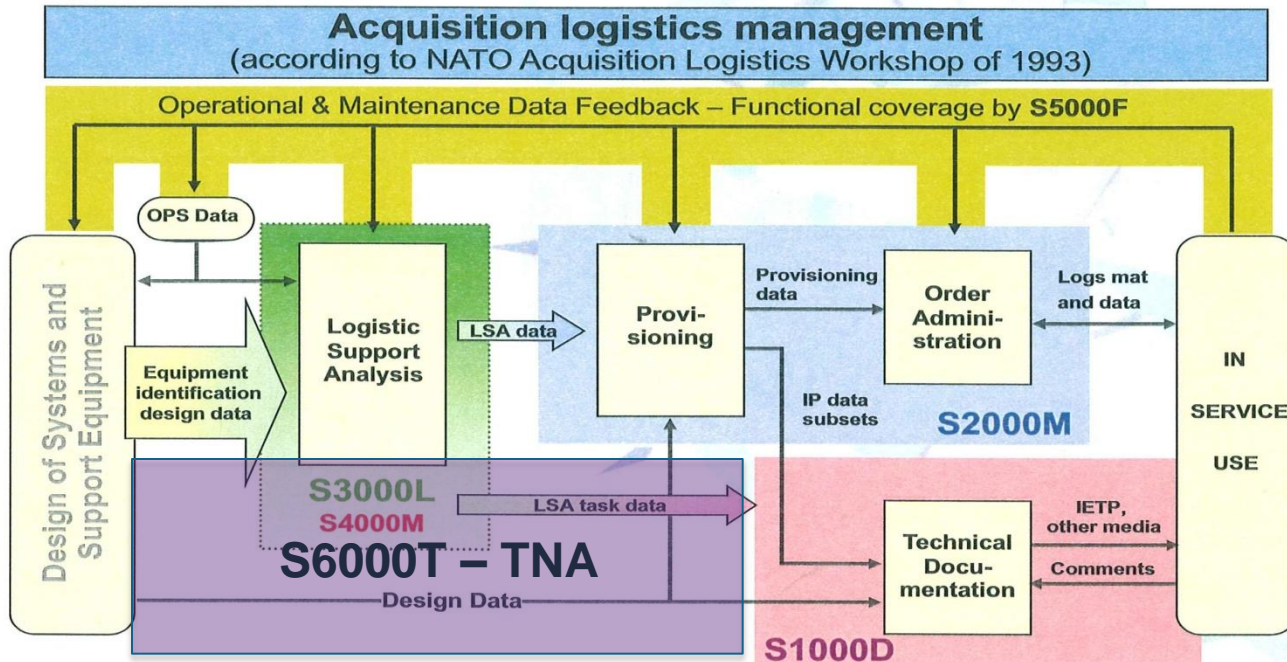
# Training Analysis in System Acquisition



**ASD** AeroSpace and Defence  
Industries Association of Europe

**EADS**  
DEFENCE  
& SECURITY

## Acquisition Logistics Main Business Processes





## ***S1000D to SCORM Connection:***

### ***Why Use S1000D for Technical Training Content?***



# Facts About SCORM



- No asset (file) naming convention
  - No equivalent “DMC”
  - SCORM is used for *any content*
- No XML markup for content
  - Content is used in any format of choice
- No defined way to “chunk” information
  - No business rules to define what is “re-usable”

**These facts are “*intentional*”**



# Facts about Technical Learning Content



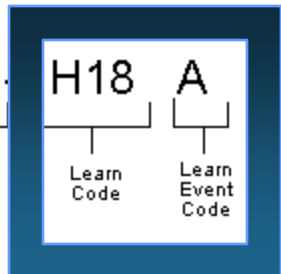
- Technical learning content is based on “authoritative sources” (technical publications, eng drawings)
- Technical learning content must be “maintained” as the product and the technical data change
- Technical learning content is out date quickly if links to authoritative sources are not “maintained”
- Costs go up when “all related technical content” are not maintained by a common specification



# Why Use S1000D for Technical Training Content?



- S1000D: An XML-based specification that chunks technical data and learning assets into reusable content.
- Helps technical training to be configured to systems and authoritative content through metadata. <IdentAndStatus>
- File naming rules promotes content management for technical learning – The Data Module Code



***Let S1000D be the regulating format for  
technical learning content  
AND  
authoritative source technical publications***



# Comparing SCORM to S1000D



Function	S1000D	SCORM 2004
Aggregation	S1000D - PubModule, scormContentPackage, SCO DM	IMS Manifest
Sequencing	S1000D - Process Data Module	IMS Simple Sequencing
Granularization and Reuse	S1000D - Data Modules	Sharable Content Objects
Meta Data	S1000D - <idStatus>, <pmStatus>, <scormContentPackageStatus>	Learning Object Metadata (Institute for Electronics and Electrical Engineers, LOM)
Content	S1000D- Learning Data Modules	No reference to content and format
Reporting and Interfacing	S1000D- Data and communication protocol not specified	IEEE ECMA Script API for Content-to-Runtime Services Communication



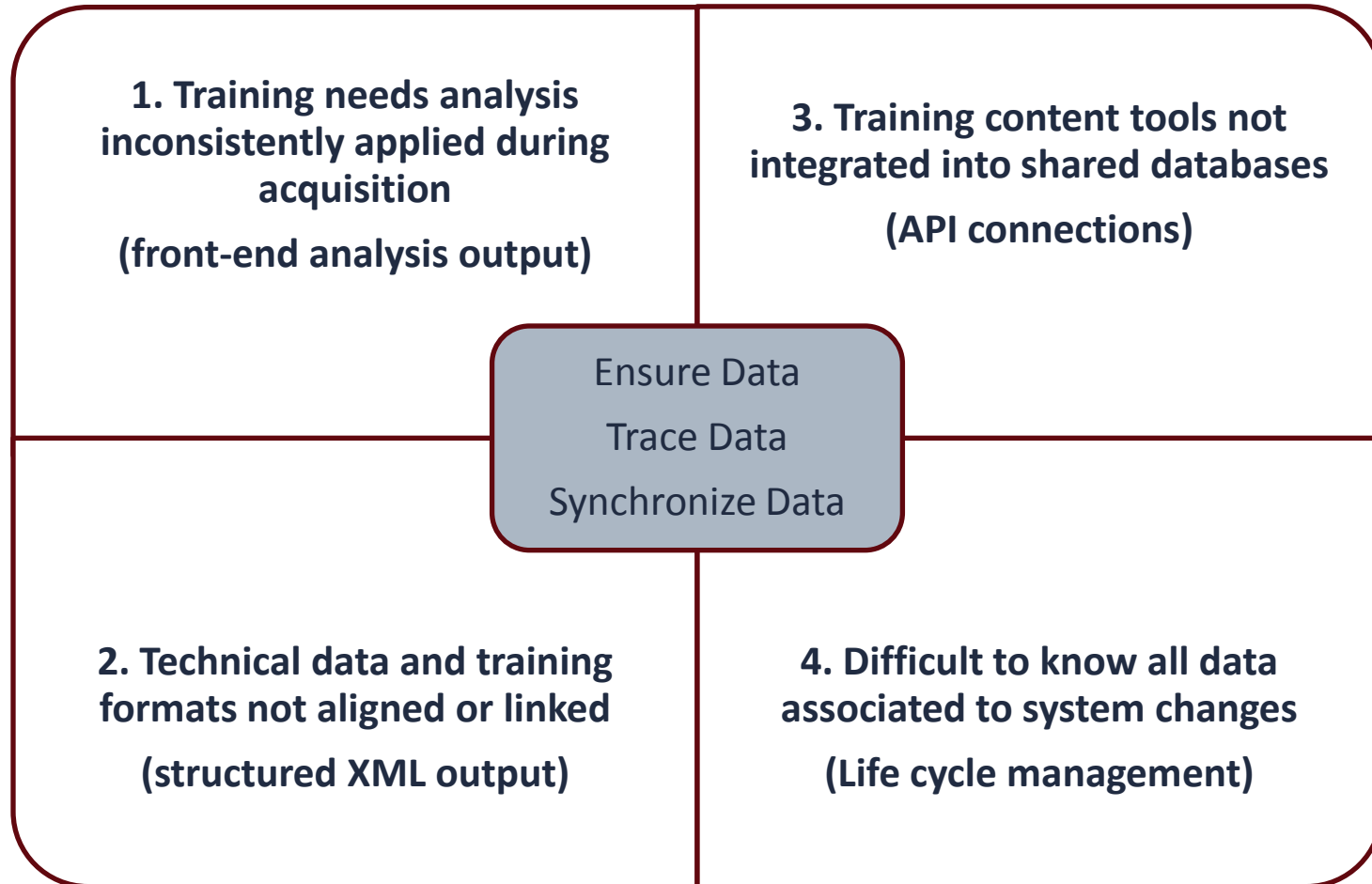
## **Supporting the Development, Management and Delivery of Distributed Learning**

( ADL Insights Announcement about Bridge Project distributed June 6:

[http://ymlp.com/zK5nbq\\_](http://ymlp.com/zK5nbq_) )

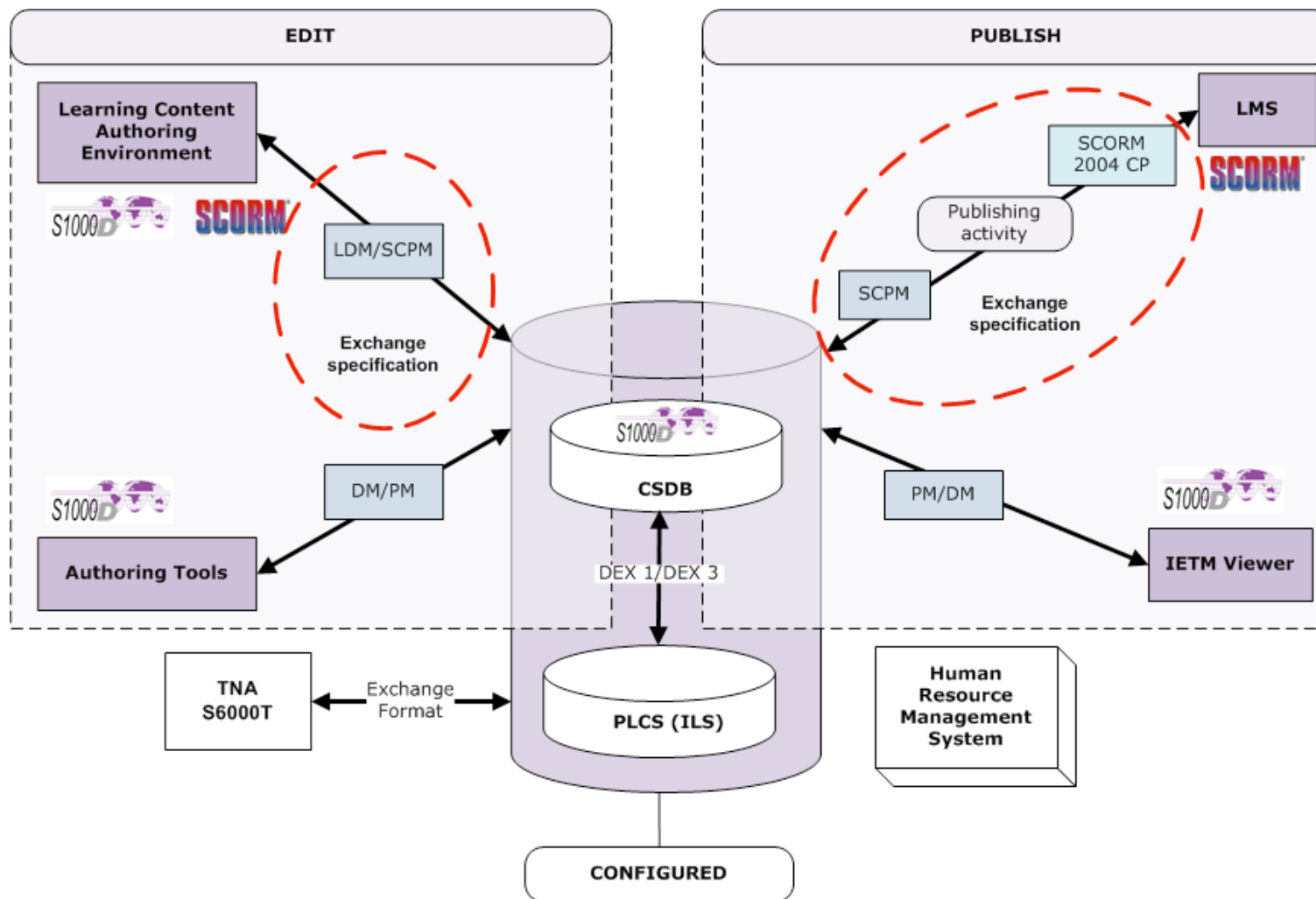


# Problem Statements





# Identified Gaps





# RTOC Bridge Project: Core Open Source Tools



- **S1000D Bridge Application Programming Interface (API)**
  - Enables training development tools access to CSDBs.
- **S1000D Learning Content Editor: AIM and SCO Workbench**
  - Enables courseware planning and organization; learning data module creation
- **S1000D Transformation Toolkit**
  - Converts S1000D LDMs/DMs to SCORM, mobile & PDF
- **S1000D Bridge DM Life Cycle Management Service**
  - Identifies all LDMs/DMs in a CSDB linked to a system change proposal



*S1000D* THE  
BRIDGE PROJECT *SCORM*

# S1000D Bridge API



# Bridge API



- Specified web service-based communication protocol
  - Expose a set of standard communication protocols for interface with a common source database.
  - Any application needing access to S1000D data – our use case has been on learning content authoring tools
- First draft of specification completed
- Pursuing submission to OASIS



# Bridge API



- Common general purpose “functions”
  - Connecting, disconnecting, searching, retrieving
- Testing environments
  - Open Source - SCOWorkbench
  - Government - Navy’s Authoring Instructional Materials
  - Industry - Contenta & Corena
- ***Status*** – Draft complete.



*S1000D* THE BRIDGE PROJECT *SCORM*

## Life Cycle-based Demonstrations:

Authoring  
Publishing  
Maintaining



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Authoring: SCO Workbench



# Authoring SCO Workbench



- SCO Workbench – Tool for developing SCORM content (open source - <http://www.openscorm.org/wiki/>)
  - Building support for S1000D authoring
    - Courseware training plans
    - Courseware content
    - Courseware assessments



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# Publishing: S1000D Transformation Toolkit



# S1000D Transformation Toolkit



- Open source S1000D Transformation Toolkit
- Current transformation support
  - S1000D SCPM to SCORM 2004 3<sup>rd</sup> Edition Content Packages
  - S1000D to Mobile Platform (Android, iPhone)
  - S1000D SCPM to PDF
  - Java-based toolkit
  - Documentation
- **Status** – code and documentation available on SourceForge ( <http://s1000d-scorm.sourceforge.net> )
- **Status** – Mobile S1000D Bike Course available at <http://s1000d-scorm.adlnet.gov/JQueryMobileTest3/> (or <https://s1000dbikemobile.appspot.com>)



*S1000D* THE BRIDGE PROJECT *SCORM*

Maintaining  
Distributed Learning Content:

**S1000D Product Data  
Identification Service**



# S1000D Product Data Identification Service



- Used to locate all DMs associated with a design change
- Uses DMRL to create system tree view
  - Uses SNS for each node
- Ability to select any node for targeted DM query
- Location:  
<http://sourceforge.net/projects/s1000dscorm-lcs/>



# Thank you!

Wayne Gafford, ADL  
[wayne.gafford@adlnet.gov](mailto:wayne.gafford@adlnet.gov)

Schawn Thropp, CTC  
[ThroppS@ctc.com](mailto:ThroppS@ctc.com)

Mark Ewer, LSI  
[mewer@LSIJAX.COM](mailto:mewer@LSIJAX.COM)

Leslie Lucas  
[Leslie.lucas@navy.mil](mailto:Leslie.lucas@navy.mil)